WE CLAIM:

- A system for prescribing point-to-point channels among nodes, comprising means for
 inputting the total number of nodes;
 inputting the total number of nodes;
 determining an assignment of fewest channels
 that guarantees every pair of fault-free nodes is connected by some path in the same quorum;
 and outputting the channel assignments.
- 2. The system as recited in claim 1, with means for minimizing the quorum radius or diameter.
- 3. The system as recited in claim 1, with means for inputting channel cost; and determining a minimum cost channel assignment.
- 4. The system as recited in claim 1, with means for inputting latencies for nodes and channels; and determining a minimum cost channel assignment that minimizes the maximum quorum latency.
- 5. The system as recited in claim 1, with means for inputting capacities for nodes and channels; and determining a minimum cost channel assignment which maximizes quorum throughput.
- 6. The system as recited in claim 1, with means for inputting node values; and determining a channel assignment with maximum quorum value, gross or net.
- 7. The system as recited in claim 1 with faults distributed probabilistically or deterministically.
- 8. The system as recited in claim 1, such that the guarantee of quorum formation is replaced by probabilistic assurance.
- 9. The system as recited in claim 1, such that faults may occur in channels, nodes, or both channels and nodes.
- 10. The system as recited in claim 1, such that the channel assignment is required to be regular, or nearly so.
- 11. The system as recited in claim 1, such that the quorums may contain an arbitrarily specified number or proportion of faults.
- 12. The system as recited in claim 1, such that the channel assignments correspond to test assignments for mutual test and diagnosis (MTAD).
- 13. The system as recited in claim 1, such that edges in the underlying graph model are generalized to directed multi-edges or hyper-edges.
- 14. A computer implementation of the system recited in claim 1.
- 15. The computer implementation as recited in claim 14, with the objective of designing or operating multicomputers, networks, bus structures, or circuits.
- 16. A method for prescribing point-to-point channels among nodes, comprising

inputting the total number of nodes; inputting the total number of nodes;

determining an assignment of fewest channels

that guarantees every pair of fault-free nodes is connected by some path in the same quorum; and outputting the channel assignments.

17. The method as recited in claim 16, additionally minimizing the quorum radius or diameter.

- 18. The method as recited in claim 16, additionally inputting channel cost; and determining a minimum cost channel assignment.
- 19. The method as recited in claim 16, additionally inputting latencies for nodes and channels; and determining a minimum cost channel assignment that minimizes the maximum quorum latency.
- 20. The method as recited in claim 16, additionally inputting capacities for nodes and channels; and determining a minimum cost channel assignment which maximizes quorum throughput.
- 21. The method as recited in claim 16, additionally inputting node values; and determining a channel assignment with maximum quorum value, gross or net.
- 22. The method as recited in claim 16, with faults distributed probabilistically or deterministically.
- 23. The method as recited in claim 16, such that the guarantee of quorum formation is replaced by probabilistic assurance.
- 24. The method as recited in claim 16, such that faults may occur in channels, nodes, or both channels and nodes.
- 25. The method as recited in claim 16, such that the channel assignment is required to be regular, or nearly so.
- 26. The method as recited in claim 16, such that the quorums may contain an arbitrarily specified number or proportion of faults.
- 27. The method as recited in claim 16, such that the channel assignments correspond to test assignments for mutual test and diagnosis (MTAD).
- 28. The method as recited in claim 16, such that edges in the underlying graph model are generalized to directed multi-edges or hyper-edges.